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U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1376

NATURAL AND ARTIFICIAL BROODING OF CHICKENS



SUCCESSFUL brooding of chickens depends on the skill of the operator as well as on the production of good, fertile eggs that hatch strong and vigorous chickens. Whether the chicks are brooded artificially or in the natural way, the attention given the brooders or hens during the brooding period is an important factor.

There is danger of overfeeding, especially if the chicks are confined to small runs, and a danger of overcrowding, overheating, and not giving heat enough. All or any of these conditions may mean disaster to the brooding operations.

No definite rules can be laid down by which to guide the novice during the brooding period, but the information contained in this bulletin will be found to be of help if carefully followed.

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NATURAL AND ARTIFICIAL BROODING OF CHICKENS.

By ALFRED R. LEE, *Poultryman, Animal Husbandry Division, Bureau of Animal Industry.*

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THE proper brooding of chickens is one of the most difficult operations on poultry farms, especially for the beginner. Many poultry keepers who are able to get good egg yields and fair hatches make a failure of brooding chickens, either raising only a small percentage of the chickens hatched or failing to rear strong, vigorous birds which develop into good breeding stock. Methods of artificial brooding are being improved each year, but no one system has given perfect satisfaction.

Brooding with hens is the simplest and easiest way to raise a few chickens and is the method which is used almost exclusively on the average farm. Artificial brooders are necessary where winter or very early spring chickens are raised, or where only Leghorns or other nonsitting breeds of poultry are kept. They are necessary also where large numbers of chickens are raised commercially. Successful natural rearing of chickens requires convenient facilities and regular attention. Although artificial methods require a larger investment, closer attention, and more care, they are more commonly used where large numbers of chickens are raised.

REARING CHICKENS WITH HENS.

Sitting hens should be confined to slightly darkened nests at hatching time and not disturbed unless they step on or pick their chickens when hatching, in which case the chickens, as soon as dry, should be removed to a basket lined with flannel or some other warm material, and kept warm until all the eggs are hatched; or the eggs may be removed and placed under a quieter hen whose eggs are hatching at the same time. An incubator may also be used to keep the earliest hatched chickens warm, in case they are removed from the nest. If the eggs hatch unevenly, those which are slow in hatching may be placed under other hens, as hens often get restless after a part of the chickens are out, allowing the remaining eggs to become cooled

at the very time when steady heat is necessary. Remove the eggshells and any eggs which have not hatched, as soon as the hatching is over.

Hens should be fed as soon as possible after the eggs are hatched, as feeding tends to keep them quiet; otherwise many hens will leave the nest; at this time, however, do not allow the chicks to have any feed. In most cases it is best that the hen remain on the nest and brood the chickens for at least 24 hours after the hatching is over.

Broody hens are often used to raise incubator-hatched chicks and to take the place of the artificial brooder, a practice that is in operation by some poultrymen. A few eggs are put under the hen four or five days before the incubator is to hatch. In the evening following the hatch of the incubator, after the chickens are thoroughly dry, one or two are put under the hen, and if she is found to mother them



FIG. 1.—Using sodium-fluorid treatment for lice on a hen before transferring her to the brood coop.

properly, the next evening as many more are added as she can brood or care for properly.

Capons are sometimes used for brooding chicks, in which case they are handled the same as hens. As some capons will not brood chickens, they must be tried out as is described for hens. A capon will brood a considerably larger number of chickens than a hen will, on account of his larger size.

Hens will successfully brood 10 to 15 chickens early in the season, and 15 to 20 in warm weather, depending upon the size of the hen. This method of handling chickens may be used where one has only a small number of chickens to raise and it is also a good method when it is desired to raise separately special lots of chicks. It should be borne in mind, in giving chickens to a hen which already has some to brood, that it is best to add chicks of the same color and age as those already with her, as the hen will often pick the later arrivals if they

are of a color different from those she is already brooding. This transferring should take place at night, although with a docile hen it sometimes can be done during the day.

Sodium fluorid should be applied to sitting hens before the chicks are hatched, to kill lice. (See fig. 1.) This should prevent the chicks from becoming infested with lice, but if it does not, apply sodium fluorid to the chicks after they are 1 week old, using only two very small pinches to each chick. One pinch should be distributed on the neck, top of head, and throat, and the other on the back and below the vent. The hen should be given only three pinches, one on the head and neck, one on the back, and one below the vent. The treatment should be given to the chicks while they



FIG. 2.—Hens confined to the brood coops. There is a wire door back of the boarded front of this coop which can be slid forward. This arrangement furnishes the hen and chicks plenty of ventilation and fresh air at night and prevents any animals from entering the coop.

are active, and for a time they should be prevented from hovering, so that the free powder will be shaken off. Do not use sodium fluorid on young chicks before they are 1 week old, as it may be injurious to them.

BROOD COOPS.

Chickens hatched during the winter should be brooded in a poultry house, shed, or cellar when the weather is cold; after the weather becomes more favorable they should be reared in brood coops out of doors. Brood coops should be made so that they can be closed at night to keep out cats, rats, and other animals, but ventilation enough should be allowed so that the hen and chicks will have plenty of fresh air. The construction of brood coops should be such as to permit them to be easily cleaned and sprayed. A good coop is illustrated in Figure 2. This coop is used at the Government poultry

farm at Beltsville, Md. Full details and specifications for building it are given in *Farmers' Bulletin 574, "Poultry House Construction,"* page 16. Other styles of coops are shown in Figures 3 and 4.

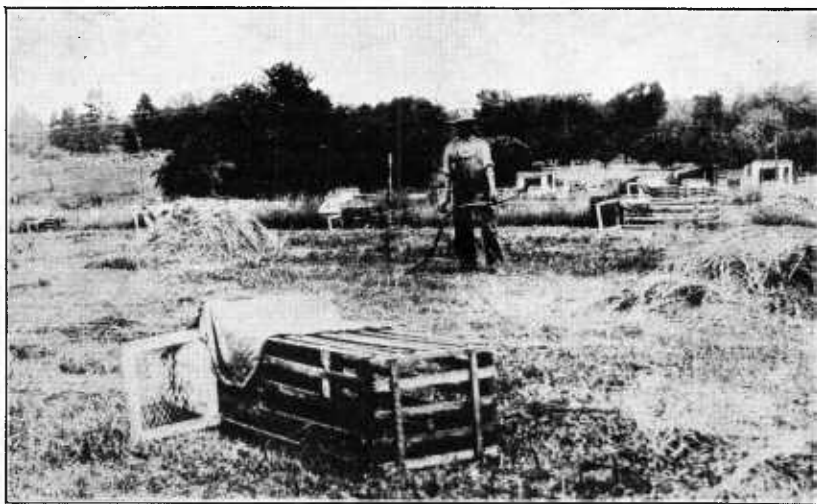


FIG. 3.—Brood coop with small run for hen, showing wire door which can be closed at night. The burlap covering on top of the coop and frame is to protect the hen from the sun and rain.

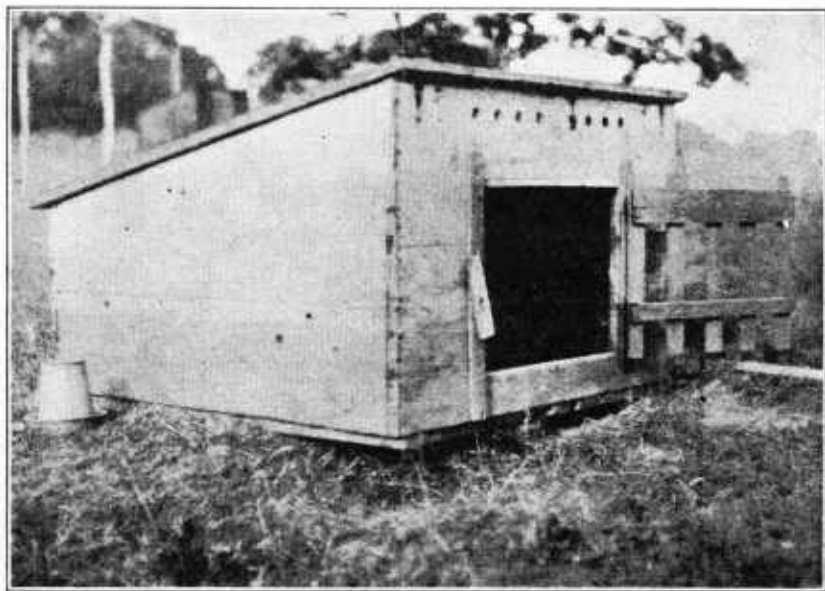


FIG. 4.—Box-shaped brood coop. New lumber need not necessarily be used, as such a coop is easily constructed from dry-goods boxes or other available material.

CONFINE THE MOTHER HEN.

The hen should be confined in the coop, or in a small yard attached to the coop, until the chicks are weaned, the chickens being allowed

free range after they are a few days old. The use of a small, covered yard attached to the coop gives the hen more freedom and keeps her in better condition than if she is confined to the coop. If hens are allowed free range and have to forage for feed for themselves and chicks (Fig. 5), they often take them through wet grass, where the chicks may become chilled and die. Most of the feed the chicks get in this manner goes to keep up the heat of the body, whereas feed eaten by those with a hen that is confined produces more rapid growth, as the chicks do not have so much exercise. Then, too, in most broods there are one or two chicks that are not so strong as the others, and if the hen is allowed free range the weaker ones often get behind and out of hearing of the mother's cluck and call. In most cases this results in the loss of these chicks, due to becoming chilled.

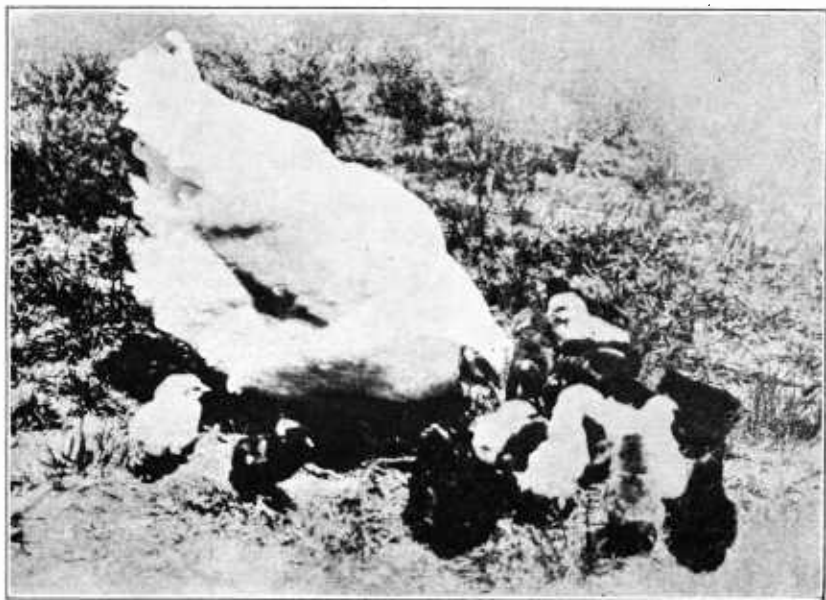


FIG. 5.—Hen and chicks allowed free range. Large losses are sustained where this method of growing chicks is practiced.

If the hen is confined the weaklings can always find shelter and heat under her, and after a few days may develop into strong, healthy chicks.

Even when confined, the chickens frequently have to be caught and put into their coops during sudden storms, as they are likely to huddle in some hole or corner, where they get chilled or drowned. They must be kept growing constantly if the best results are to be obtained. Chickens never entirely recover from the effects of checks in their growth even for a short period. Hens are usually left with their young chicks as long as they will brood them.

CARE OF THE BROOD COOP.

The brood coop should be cleaned at least once a week and kept free from mites. If mites are found in the coop, it should be thor-

oughly cleaned and sprayed with kerosene oil, crude petroleum, or carbolineum, making sure that the spray reaches all the cracks and crevices where the mites may be hiding. (See fig. 6.) From 1 to 2 inches of sand or dry dirt or a thin layer of fine-cut straw or hay should be spread on the floor of the coop. Brood coops should be moved weekly to fresh ground, preferably where there is new grass. Shade is very essential in rearing chickens, especially during warm weather; therefore, the coops should be placed in the shade whenever possible. A cornfield makes fine range for young chickens, as they obtain many bugs and worms and have fresh ground to run on most of the time, due to the cultivation of the ground, and have abundant shade at the same time.

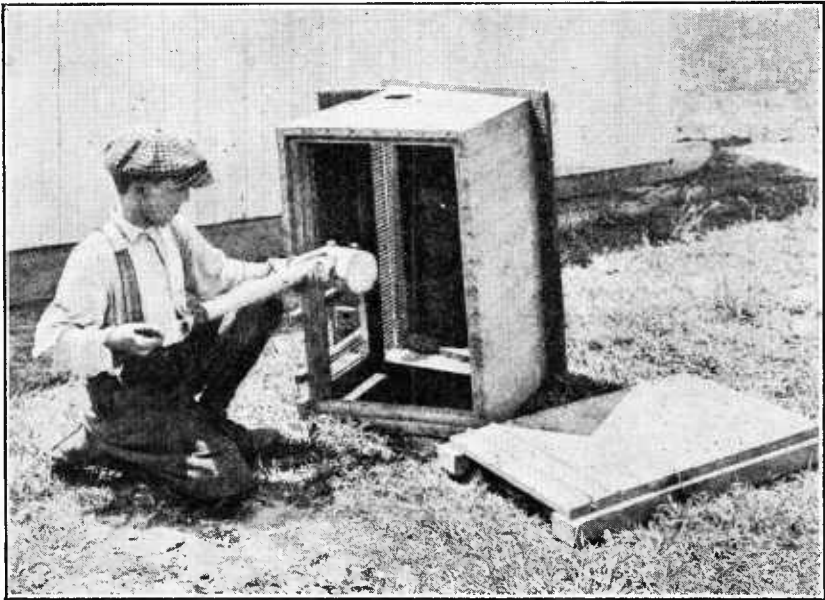


FIG. 6.—A boy poultryman spraying his brood coop to kill mites and lice.

ARTIFICIAL BROODING.

The artificial method of brooding chickens consists in supplying, artificially, heat as nearly as possible like that furnished by the hen under natural conditions. The temperature of a hen is about 106° F.,¹ but as hens seldom sit closely on chickens the latter do not receive this degree of heat. Hens adapt their methods of brooding to conditions, such as outside temperature, size of the chickens, and wet weather, and the operator of an artificial brooder must meet these conditions as nearly as he can. Some of the most important faults in the management of brooders are overcrowding and lack of ventilation, and the failure of the chickens to get sufficient exercise. The brooder should supply the proper temperature, be readily adapted to meet the changes in weather conditions, be easy to clean, and be well ventilated.

¹ See Farmers' Bulletin 1363, "Natural and Artificial Incubation of Hens' Eggs."

Chickens are usually left in the incubator from 24 to 36 hours after hatching, without feeding,² before they are removed to the brooder, which should have been in operation for 3 or 4 days at the proper temperature for receiving chickens. A beginner should try his brooding system carefully before he uses it. After being placed in the brooder the chickens can be given feed and water. Subsequent loss in chickens is frequently due to chilling received while taking them from the incubator to the brooder. In cool or cold weather they should be moved in a covered basket or other receptacle.

Brooders and hovers should have from $\frac{1}{2}$ to 2 inches of sand, dry dirt, cut clover, or chaff spread over the floor and in the brooder-house pen. The hovers should be cleaned frequently, as cleanliness is essential in successfully raising chickens.

When chickens are first put into the brooder they should be confined under or around the hover by placing a board or wire frame a few inches outside. The fence or guard should be moved farther and farther away from the hover and discarded entirely when the chickens are 3 or 4 days old or when they have learned to return to the source of heat. Young chickens should be closely watched to see that they do not huddle or get chilled. They should be allowed to run on the ground whenever the weather is favorable, as they do much better than when kept continuously on cement or board floors. Usually, weak chickens should be killed as soon as noticed, as they rarely make good stock, and they may become carriers of disease. Brooders should be disinfected at least once a year, and more frequently if the chickens brooded in them have had any disease.

HOVERS, BROODERS, AND BROODING SYSTEMS.

Many kinds of hovers, brooders, and brooding systems are used throughout the country, some with success, although many are discarded as failures, while each year brings some modification or change. One poultryman uses a system successfully, while his neighbor may make a failure of the same system, but does well with another. More difference of opinion exists as to the value of brooding systems than with any other part of poultry equipment, which shows that no system is ideal for all conditions or all people, but that success depends largely on individual handling and care. Many failures in brooding are due to weak chickens, which may be traced to faulty incubation or weakness in the breeding stock. Successful rearing of chickens depends primarily upon having healthy, vigorous breeding stock.

Brooding systems may be classified as follows, according to their capacity: Individual brooders or hovers holding from 25 to 100 chickens; stove brooders heated by coal, kerosene, or distillate oil, with a capacity varying from 200 to 1,000 chicks; and hot-water-pipe systems, the capacity of which is unlimited. The beginner, if possible, should thoroughly investigate the brooding equipment used by successful poultrymen or farmers, which has been in operation for some time.

² See Farmers' Bulletin 1363, "Natural and Artificial Incubation of Hens' Eggs."

INDIVIDUAL HOVERS AND BROODERS.

The small individual hovers and brooders are heated with either hot air or hot water, with kerosene oil as the source of heat. Hovers are used either in brooder houses or in small colony houses, and outdoor brooders are used successfully under favorable weather conditions; but where chicks are hatched late in the winter or early in the spring indoor hovers, stove brooders, or brooder houses are more satisfactory. The capacity of brooders and hovers is often overestimated, and half of the number of chickens will do much better than the number usually recommended by the manufacturer. The danger from fire, due frequently to carelessness and lack of attention, is considerable in cheap brooders and hovers, while there is some risk in the best grades, although proper care will reduce this to a minimum. Individual hovers in colony houses or several in

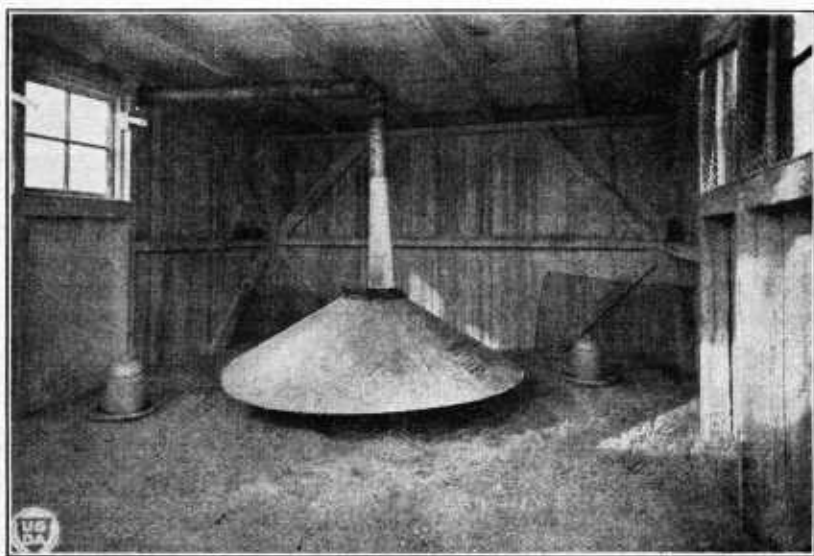


FIG. 7.—Interior of brooder house, showing colony stove brooder, and hover. The wire keeps the chicks from packing in the corner of the house.

one large house are giving satisfaction. When a lamp is used as the source of heat, care should be taken to keep the wick and burner properly cleaned. Brooder lamps and stoves should be inspected several times a day. Do not fill the brooder lamp entirely full of oil, as the heat from the lamp will expand the oil in the bowl and may cause it to overflow and catch fire.

Brooder stoves heated by coal are coming into very general use in the East, while similar brooders heated with engine distillate oil are used extensively on the Pacific coast. These brooder stoves have a capacity of from 350 to 1,000 chicks each, but the brooding of more than 500 chicks in one flock is not advisable and even a smaller number is preferable. Most of these stoves have hovers, although a few of the oil stoves do not. A stove with a hover is preferable.

Large individual brooders are used in colony houses (see fig. 7), so that when the chickens are weaned the colony house is available for use as a growing coop. This arrangement requires a smaller investment than the long, piped brooder house, and allows the rearing of the chicks on range to advantage. Brooder stoves of both types are usually operated in houses from 10 feet square to 14 by 20 feet (see fig. 8) and are occasionally used in long brooder houses.

Most of the oil brooders are equipped with a wafer regulator that controls the flow of oil, which is fed automatically from a tank or barrel outside the house. Several stoves may be connected with the

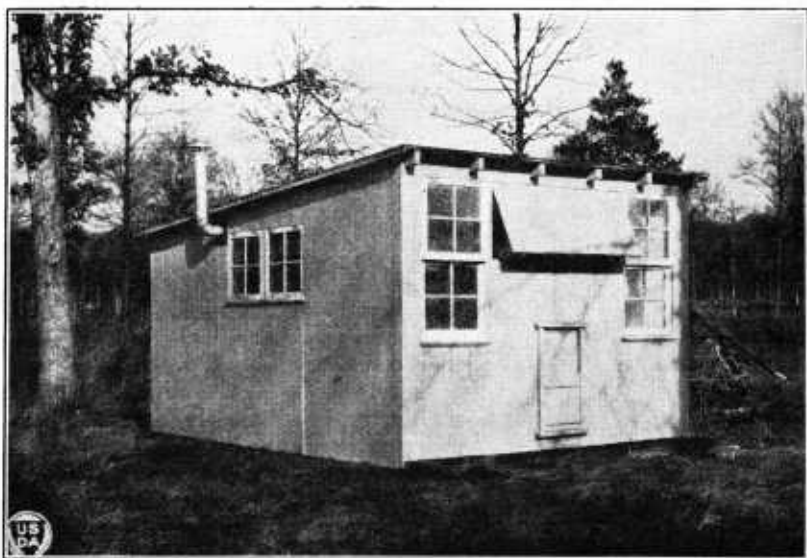


FIG. 8.—Shed-roof, coal-heated brooder house, 10 by 14 feet, with a capacity of 500 chicks.

same supply tank. This brooding system provides good ventilation and heat enough to keep the chickens from crowding and requires a minimum of care.

Brooder stoves heated by kerosene are used somewhat in the East, but their use is not nearly so common as that of the coal-heated brooders, and they have not proved nearly so satisfactory. In the eastern part of the country it is difficult to get sufficient heat from these kerosene-heated stoves when the early chicks are hatched.

HOT-WATER-PIPE BROODERS.

The system of hot-water-pipe brooders consists of long brooder houses heated with hot water, coal being used almost exclusively for fuel. Many of the latest of these mammoth brooders are giving good results, and the labor of brooding a large number of chickens is less than when small individual brooders or hovers are operated. These brooders are suitable for very large poultry farms or where broilers are raised during the winter months.

METHOD OF HEATING.

Brooders are heated either by overhead or bottom heat or by a combination of the two methods. Too much bottom heat does not give good results, but either the overhead or the combination method is used successfully. The individual brooder stoves all furnish overhead heat, but allow the chickens to move about, which makes them one of the most satisfactory types of brooding systems.

Many pipe systems have a hover or cover over a section of the pipes in each pen, while others are used without them, and each appears to give good results with different operators. A piece of wool felt or cotton flannel is often used for this purpose.

Gas and electricity are also used for heating brooders and hovers with success, and, when available, supply one of the steadiest and most convenient sources of heat.

Heaters for the mammoth brooders or hot-water-pipe systems are usually equipped with automatic regulators, which are operated by either expansion of water or electric contact. Both types of regulators have given satisfaction. A reliable regulator is essential to success with any of these systems.

FIRELESS BROODERS.

Fireless brooders are used with success by some persons, but require much more attention than heated brooders and are advisable only for emergency use. As their construction is very simple, many persons prefer to build rather than buy them. In this system of brooding, the body heat of the chickens is the source of warmth, requiring that a sufficient number of chickens, depending upon the size of the brooder, be placed in the brooder to generate and retain the heat. Small, fireless hovers with adjustable covers composed of strips of cloth or feathers are used in both indoor and outdoor brooders and in colony houses. A bottle or jug of hot water is sometimes used with these brooders, hot water being put in every night or as often as is necessary to keep the chicks warm and comfortable. A box from 18 to 24 inches square and from 8 to 10 inches deep makes a good hover of this type. The position of the cover used over the chickens in this box is regulated according to the weather and the number of the chickens in the brooder. In very cold weather the cover should sag so as to rest on the backs of the newly hatched chickens, and there should be little or no empty space in the hover, while in warmer weather or with older chickens the cover is raised.

From 12 to 40 chicks are usually placed in a fireless brooder, 25 being the average number. The litter in these brooders must be changed frequently, and the chickens must be watched carefully and closely to see that they are comfortable and do not sweat. Fireless brooders may be used in connection with heated brooders, using the latter for 7 to 10 days and reducing the heat, which should be governed by the season of the year and outdoor temperatures, before transferring the chickens to the fireless brooder. When first placed in the fireless brooder the chickens may have to be put under the hovers frequently, until they learn where to get warm. Fair results are also obtained with these brooders when used in a heated room.

CORRECT TEMPERATURES FOR BROODING.

The best temperature at which to keep a brooder or a hover depends on the position of the thermometer, the style of the hover, the age of the chickens, and the weather conditions. Aim to keep the chickens comfortable. When too cold they will crowd together and try to get nearer the heat. If it is found in the morning that the droppings are well scattered under the hover it is an indication that the chickens have had heat enough. If the chickens are comfortable at night they will be spread out under the hover with the heads of some protruding from under the hover cloth. Too much heat causes them to pant and gasp and sit around with their mouths open.

It is impracticable to state for each style of hover or brooder at what temperature it should be kept to raise young chickens. In most cases it should be run at from 90° to 100° F. when the chickens are first put in, and should be kept at that temperature in stove brooders as the chickens are able to adjust themselves to the heat, moving nearer or farther from the heat, according to the outside temperature. In such brooders the heat is usually kept at this temperature as long as the chicks need brooding. In small hovers, outdoor brooders, and pipe systems where a tighter hover is used and chicks do not have the same opportunity to adjust themselves to the heat, the temperature is gradually reduced to 85° F. for the second 10 days, and then lowered to 70° or 75° F. as long as the chickens need heat. This depends somewhat on the season of the year and the number of the chickens, as it can be readily seen that the heat generated by 50 chickens would raise the temperature under the hover to a higher degree than the heat given off by a smaller number; consequently the amount of heat furnished by the lamp or stove will have to be regulated accordingly. As the chickens grow larger and need less heat, the lamps need be used only at night, and later only on cold nights. The heat is usually cut off at the end of 5 or 6 weeks in March or April in the vicinity of Washington, D. C., but winter chickens should have heat for 8 or 10 weeks, or until they are well feathered. Care should be taken to prevent chilling or overheating the chickens, which weakens them and may result in bowel trouble.

Chickens need a cool place for scratching and exercising in addition to heat. The brooder stove is usually placed in the rear part of the brooder house so that the front of the house will be cooler, or the brooder house may be divided into two sections, one in which the stove is placed, and a cool room for exercising and feeding. It is important to get the chickens out on the ground as soon as possible whenever the weather is good and not too cold. Indoor brooders and hovers can be used successfully in unheated brooder houses, except during the coldest weather in most sections of the country. If winter chickens are being raised it is advisable to heat the brooder house to a temperature of 60° to 70° F. regardless of the temperature of the hover, which often requires placing brooder pipes around the outside walls of the brooder house. The need of this heat depends entirely upon the brooding system and the weather conditions; but it is absolutely necessary that the heat be kept at the desired temperature under the hover.

Colony brooder houses and growing houses on the range at the Government farm at Beltsville, Md., are shown in Figure 9.

CARE OF PURCHASED DAY-OLD CHICKS.

Buyers of chicks should provide a brooder of sufficient capacity for the number of chickens purchased and have it in working order and regulated when the chicks arrive. If for any reason the brooder is not ready, place the shipping box in a warm room, keeping the chicks in it and taking them out for feeding every 3 hours during the day until the brooder is ready. It sometimes happens that delay in the delivery of a brooder places one at a disadvantage as to what to do with the chickens. In such cases a fireless brooder may be con-



FIG. 9.—Colony brooder houses and growing houses on range.

structed temporarily, as described on page 10. After the chickens have been placed in their brooder and made comfortable they should be managed as described in the foregoing pages.

FEEDING YOUNG CHICKENS.

Young chickens should be fed from three to five times daily, depending on one's experience in feeding. Undoubtedly chickens can be grown faster by feeding five times daily than by feeding three times daily, but it should be borne in mind that more harm can be done to the young chickens by overfeeding than by underfeeding, and at no time should they be fed more than barely enough to satisfy their appetites and to keep them exercising, except at the evening or last meal, when they should be given all they will eat. Greater care must be taken not to overfeed young chicks that are confined than those that have free range, as leg weakness is likely to result in those confined.

The young chicks should not be fed until they are about 48 hours old, whether they are with the hen or in a brooder. If home mixing

of feed is to be followed the first feed should consist of baked johnnycake broken up into small pieces, or hard-boiled eggs mixed with stale bread crumbs or rolled oats, using a sufficient quantity of the latter to make a dry, crumbly mixture, or a mash of 2 parts rolled oats, 1 part bran, and 1 part middlings by weight, mixed with milk or with boiled eggs. These feeds or combinations of feeds may be used with good results for the first 3 or 4 days. Then gradually substitute daily for two feeds a mixture of equal parts of finely cracked wheat, cracked corn, and pinhead oatmeal or hulled oats, to which may be added a small quantity of broken rice, millet, or rapeseed, or all combined, and charcoal if obtainable. If corn can not be had, cracked kafir or rolled or hulled barley may be substituted.

Commercial baby-chick scratch and chick mash may be fed to advantage in place of the home-mixed feeds and can be bought from almost any feed dealer. Buying these ready-mixed feeds for small

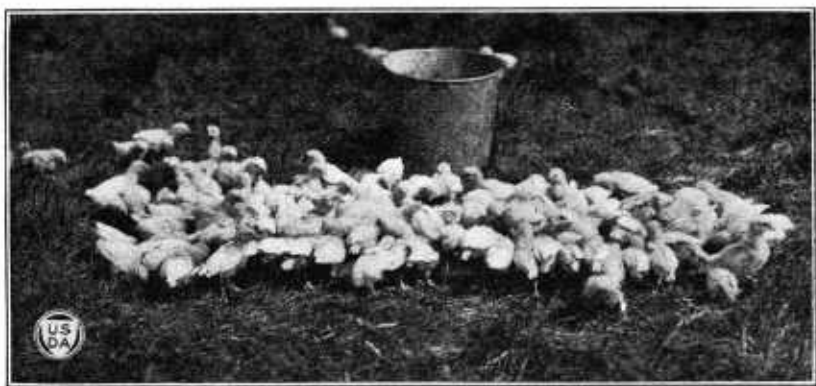


FIG. 10.—Young chickens eating a dry, crumbly mash.

chickens is much simpler than procuring the separate grains, and is no more expensive unless good-sized quantities of feed are to be bought.

Milk in some form is very beneficial for small chickens and may be kept before them as a drink and also used in mixing this moist mash. Giving the chicks a drink of milk for the first feed is an excellent practice. Commercial milk products, such as semisolid buttermilk or dried milk, make excellent additions to the feed for chicks and are well worth while for that purpose. Two per cent of dried buttermilk may be added to the mash for little chicks, if liquid buttermilk is not used, reducing the amount of meat scrap accordingly.

Johnnycake is made as follows: Take corn meal, 5 pounds; infertile eggs (tested out from settings or from an incubator), 6; baking soda, 1 tablespoon. Mix with milk to make a stiff batter, and bake thoroughly. When infertile eggs are not available use a double quantity of baking soda and add one-half pound of sifted meat scrap.

When the chicks are about 10 days or 2 weeks old, use a growing mash composed of the following to take the place of the johnnycake or bread; Rolled oats, 1 part by weight; bran, 2 parts; corn meal, 1 part; middlings, 1 part; sifted meal scrap, $\frac{1}{2}$ part.

Where only a few chicks are raised the laying mash (used for laying hens) may be used for little chicks by adding 1 pound of rolled oats and 1 pound of bran to 2 pounds of the laying mash.

The mash may be placed in a hopper where it will not be wasted, and left before the chicks at all times, or it may be fed as a moist, crumbly mash once daily, feeding suitable chick grains three times a day. (See fig. 10.)

When the chickens are 8 or 10 weeks old add 1 part of ground oats and increase the meat scrap to 1 part, the corn meal to 2 parts, and decrease the bran to 1 part in the mash. As soon as the chickens will eat the whole meat, cracked corn, and other grains, the small-sized chick feed can be eliminated and the chicks be fed only three times a day.

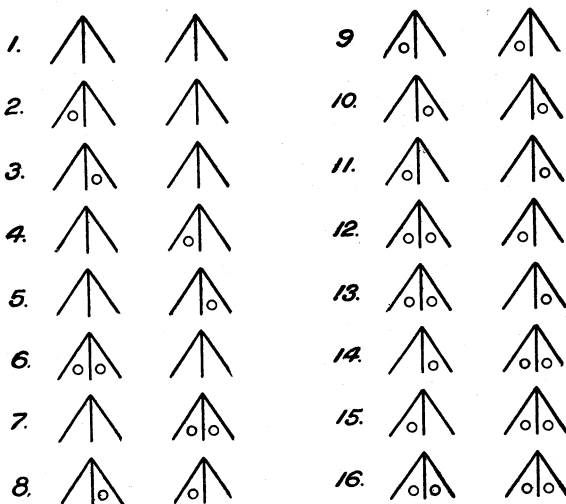


FIG. 11.—Sixteen different marks for toes of chicks.

The chickens' growth can be hastened if they are given sour milk, skim milk, or buttermilk to drink in addition to the feeds. Milk is excellent to mix with the mash.

Growing chickens kept on a good range may be given all their feed in a hopper, mixing 2 parts by weight of cracked corn with 1 part of wheat, or equal parts of cracked corn, wheat, and oats in one hopper and the dry mash in another. The beef scrap may be left out of the dry mash and fed in a separate hopper, so that the chickens can eat all of this feed that they desire. If the beef scrap is to be fed separately it is advisable to wait until the chicks are 10 days old, although many poultrymen put the beef scrap before the young chickens from the first without bad results.

Chickens confined to small yards should always be supplied with green feed, such as lettuce, sprouted oats, alfalfa, or clover; but the best place to raise chickens successfully is on a good range where no extra green feed is required. Fine charcoal, grit, and oyster shell should be kept before the chickens at all times, and cracked or ground bone may be fed where the chickens are kept in small, bare yards, but the latter feed is not necessary for chickens that have a good range.

TOE PUNCHING AND BANDING.

Farmers frequently keep old hens on their farms and kill the younger hens and pullets, because they are unable to distinguish between them after the pullets have matured. Toe punch or mark all the chickens, as shown in Figure 11, before they are transferred to the brooder or brood coop, so that their age and breeding can be readily determined after they are matured. Another method is to use colored-celluloid leg bands on the pullets in the fall, which can be purchased at almost any supply store in a variety of sizes and colors. These bands have no numbers on them and therefore if used it is necessary to adopt a different color each year.

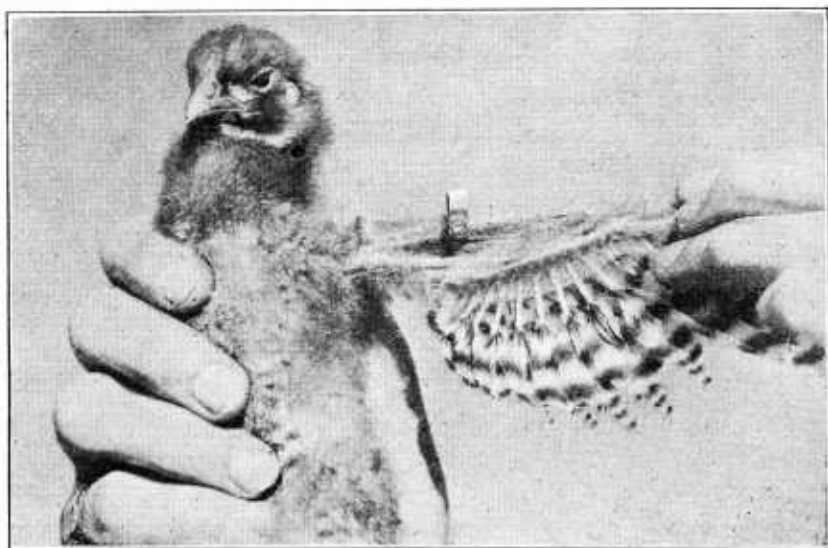


FIG. 12.—A chick banded in the wing.

There has recently come into practice, where the hens are trap nested or pedigree records kept of each egg, a system known as wing banding, for permanently identifying chickens. When this method is used a small, numbered band is placed on the leg of the chick soon after it is hatched. When the chick is about 3 weeks old a slit is made with a knife in the web of the wing, as shown in Figure 12. The band is then removed from the leg and inserted in this slit and closed, care being taken not to have the band so tight as to pinch the skin. In most cases bands properly placed in the wings of chickens will remain there throughout the life of the bird. By keeping a record of the numbers on the bands and knowing the number of the hen which laid the egg out of which the chick hatched, a complete history, including time of hatching and breeding of the birds, may be kept.

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November 19, 1923.

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